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Indian Standard
SPECIFICATION FOR CHILLED IRON SHOT AND GRIT FOR USE IN FOUNDRIES

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard
SPECIFICATION FOR CHILLED IRON SHOT AND GRIT FOR USE IN FOUNDRIES

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Indian Standard

SPECIFICATION FOR CHILLED IRON SHOT AND GRIT FOR USE IN FOUNDRIES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 27 May 1968, after the draft finalized by the Foundry Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard has been prepared to meet the requirements of the foundry industry in the country. In preparing this standard, assistance has been derived from B. S. 2451 : 1963 'Specification for chilled iron shot and grit', issued by the British Standards Institution.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This Indian Standard covers the requirements for chilled iron shot and grit.

2. DESIGNATION AND GRADING

2.1 Chilled iron shot shall be designated as S-C and graded by the shot number which is the aperture size of the retaining screen in thousandths of a millimetre (*see* Table 1).

2.2 Chilled iron grit shall be designated as G-C graded by the grit number which is the aperture size of the retaining screen in hundredths of a millimetre (*see* Table 2).

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of chilled iron shot and grit, shall be as laid down in IS : 1387-1967†.

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*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metallurical materials (*first revision*).

TABLE 1 SHOT GRADE NUMBERS

(*Clauses* 2.1 *and* 6.1)

IS Sieve Designation	Width of Aperture mm	Shot Number												
		S-C3350	S-C2800	S-C2360	S-C2000	S-C1700	S-C1400	S-C1180	S-C1000	S-C850	S-C600	S-C425	S-C300	S-C180
4·75-mm	4·75													
4·00-mm	4·00													
3·35-mm	3·35	90 / 10							All pass					
2·80-mm	2·80		90 / 10											
2·36-mm	2·36			90 / 10										
2·00-mm	2·00				85 / 10									
1·70-mm	1·70					85 / 15		5% *Max* ON						
1·40-mm	1·40						85 / 15		5% *Max* ON					
1·18-mm	1·18							80 / 15		5% *Max* ON				
1·00-mm	1·00								80 / 15					
850-micron	0·850									80 / 15	10% *Max* ON			
710-micron	0·710											10% *Max* ON		
600-micron	0·600			None pass, except 1 percent, *Max* allowed for fines							75 / 15			
500-micron	0·500												10% *Max* ON	
425-micron	0·425											75 / 15		
355-micron	0·355									None pass, except 2 percent, *Max* allowed for fines				10% *Max* ON
300-micron	0·300												70 / 20	
180-micron	0·180													70 / 20
90-micron	0·090													

Note — When IS sieves are not available, equivalent BS or ASTM sieves specified in Appendix A may be used.

TABLE 2 GRIT GRADE NUMBERS

(*Clauses* 2.2 *and* 6.1)

IS SIEVE DESIGNATION	WIDTH OF APERTURE mm	GRIT NUMBER												
		G-C236	G-C200	G-C170	G-C140	G-C118	G-C100	G-C85	G-C60	G-C42	G-C30	G-C18	G-C09	G-C05
3·35-mm	3·35													
2·80-mm	2·80													
2·36-mm	2·36	80 10							All pass					
2·00-mm	2·00		80 10											
1·70-mm	1·70			80 10										
1·40-mm	1·40				80 10									
1·18-mm	1·18					75 10								
1·00-mm	1·00						75 15							
850-micron	0·850							75 15						
710-micron	0·710													
600-micron	0·600								70 15					
500-micron	0·500		None pass, except 2 percent, *Max* allowed for fines											
425-micron	0·425									70 15				
355-micron	0·355													
300-micron	0·300						None pass, except 4 percent, *Max* allowed for fines				65 20			
180-micron	0·180											65 20		
90-micron	0·090												60 25	

NOTE — When IS sieves are not available, equivalent BS or ASTM sieves specified in Appendix A may be used.

4. MATERIAL

4.1 The chilled iron shot and grit shall be made from cast iron with a carbon content in excess of 1·7 percent and of such type that the shot and grit having been chilled shall have a white iron structure.

4.1.1 The carbon content of the material shall be determined in accordance with IS : 228-1959*.

5. SHAPE

5.1 Shot — The particles shall as far as practicable be spherical and solid, and shall not contain more than the minimum practicable amount of 'tails' and irregular particles.

5.2 Grit — The particles shall show good angularity of form with sharp cutting edges and shall be substantially free from 'half-rounds' (that is, shot split in half only).

6. SIZE

6.1 The particles size shall be determined by testing with sieves complying with IS : 460-1962†. The proportions retained and passed shall comply with the limits given in Tables 1 and 2.

Examples :

Shot Grade S-C 1 000 — The whole sample passes through 1·70-mm IS Sieve. At most 5 percent is retained on the 1·40-mm IS Sieve. At least 80 percent passing through larger sieve, is retained on 1·00 mm (corresponding to the retaining screen).

At most 15 percent passes through 1·00-mm IS Sieve. None passes through 710-micron IS Sieve.

Grit Grade G-C 60 — The whole sample passes through 1·00-mm IS Sieve. Atleast 70 percent, passing through larger sieves, is retained on 600-micron IS Sieve (corresponding to the retaining screen). At most 15 percent passes through 600-micron IS Sieve. None passes through 355-micron IS Sieve.

7. HARDNESS TEST

7.1 The Vickers hardness number shall be determined on sound individual particles on a suitable cross-section, in accordance with IS : 1501-1959‡.

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*Methods of chemical analysis of pig iron, cast iron and plain carbon and low-alloy steels (*revised*).

†Specification for test sieves (*revised*).

‡Method for Vickers hardness test for steel.

7.1.1 Particles shall be mounted in a suitable material, such as a thermosetting plastics material, and polished. If the particle cracks during the test, the result shall not be counted.

7.2 The hardness of any particle shall not be less than 750 HV.

8. PACKAGING

8.1 Unless specified otherwise the material shall be supplied in waterproof double gunny bags or inner polythene bags each containing 50 kg.

9. MARKING

9.1 Each container shall be clearly marked with the following information:

a) Manufacturer's name or trade-mark, and
b) Size and type designation of the material.

9.1.1 The material may also be marked with the ISI Certification Mark.

Note — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

10. SAMPLING

10.1 Samples each weighing 0·5 kg shall be taken from top, centre and bottom of at least five containers for every tonne of material. These samples shall be combined, mixed and quartered to obtain a 2·5 kg laboratory sample from which 100 g samples shall be taken for testing purposes. Three 100 g samples shall be required for testing, one for carbon content, one for shape and size and one for the hardness of the material. A sample splitter may be used to reduce the gross sample to the desired weight.

11. RETEST

11.1 If the sample selected fails to meet the requirements given under **4**, **5**, **6** and **7**, two further samples shall be selected for each retest. Should the two retests satisfy the requirements of this standard, the lot shall be accepted. Should either of the samples fail, the material shall be taken as not complying with the requirements of this material.

APPENDIX A

(*Note in Tables* 1 *and* 2)

COMPARATIVE SIEVE DESIGNATIONS OF IS, BS AND ASTM SIEVES

IS Sieve	*BS Sieve*	*US Standard Sieve* (*ASTM Sieve*)
4·75-mm	—	4·76 mm (4)
4·00-mm	—	4·00 mm (5)
3·35-mm	5	3·36 mm (6)
2·80-mm	6	2·83 mm (7)
2·36-mm	7	2·38 mm (8)
2·00-mm	8	2·00 mm (10)
1·70-mm	10	1·63 mm (12)
1·40-mm	12	1·41 mm (14)
1·18-mm	14	1·19 mm (16)
1·00-mm	16	1·00 mm (18)
850-micron	18	841 µ (20)
710-micron	22	707 µ (25)
600-micron	25	595 µ (30)
500-micron	30	500 µ (35)
425-micron	36	420 µ (40)
355-micron	44	354 µ (45)
300-micron	52	297 µ (50)
180-micron	85	177 µ (80)
90-micron	170	88 µ (170)

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